

JAN 31 2007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	10/750,522	Confirmation No. 1973
Applicant	:	Gardner, Donald S.	
Filed	:	December 31, 2003	
TC/A.U.	:	2823	
Examiner	:	Lee, Hsien Ming	
Docket No.	:	042390.P16465	
Customer No.	:	008791	

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT AND RESPONSE

In response to the Office action mailed November 8, 2006, please enter this amendment and consider the following remarks.

Amendments to the claims are reflected in the listing of claims that begins on page 2 of this paper.

Remarks begin on page 8 of this paper.

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Page 1 of 15

Date: January 31, 2007

To:
Examiner Hsien Ming Lee

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Art Unit:
2823

From:
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Subject:
10/750,522

Docket Number:
42P16465

Filing Date:
December 31, 2003

Inventor:
Donald A. Gardner

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- Transmittal Form (1 page)
- Fee Transmittal (1 page submitted in duplicate)
- Response and Amendment to Office Action (11 pages)

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PTO/SB/21 (09-04)

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TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	10/750,522	RECEIVED CENTRAL FAX CENTER JAN 31 2007
	Filing Date	12/31/2003	
	First Named Inventor	Donald A. Gardner	
	Art Unit	2823	
	Examiner Name	Hsien Ming Lee	
Total Number of Pages in This Submission	Attorney Docket Number	42390.P16465	


ENCLOSURES (Check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input checked="" type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Reply to Missing Parts/Incomplete Application <input type="checkbox"/> Reply to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____ <input type="checkbox"/> Landscape Table on CD	<input type="checkbox"/> After Allowance Communication to TC <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below): - Fax Transmittal
Remarks		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Intel Corporation		
Signature	/Philip A. Pedigo/Reg. No. 52,107/		
Printed name	Philip A. Pedigo		
Date	January 31, 2007	Reg. No.	52,107

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Typed or printed name	Derek S. Watson	Date	01/31/2007

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PTO/SB/17 (12-04v2)

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FEE TRANSMITTAL
For FY 2005☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$)

Complete if Known **RECEIVED**

Application Number	10/750,522	CENTRAL FAX CENTER
Filing Date	12/31/2003	
First Named Inventor	Donald A. Gardner	JAN 31 2007
Examiner Name	Hsien Ming Lee	
Art Unit	2823	
Attorney Docket No.	42390.P16465	

METHOD OF PAYMENT (check all that apply)
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FEE CALCULATION**1. BASIC FILING, SEARCH, AND EXAMINATION FEES**

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee (\$)	Fee Paid (\$)
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- 20 or HP = _____	x	_____	=	_____
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HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee (\$)	Fee Paid (\$)
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- 3 or HP = _____	x	_____	=	_____
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HP = highest number of independent claims paid for, if greater than 3.

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
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4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)

Other (e.g., late filing surcharge): _____

Fees Paid (\$)**SUBMITTED BY**

Signature	/Philip A. Pedigo/Reg. No. 52,107/	Registration No. (Attorney/Agent) 52,107	Telephone 503-712-5560
Name (Print/Type)	Philip A. Pedigo	Date January 31, 2007	

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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PTO/SB/17 (12-04v2)

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FEE TRANSMITTAL
For FY 2005☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$)

Complete if Known

Application Number	10/750,522
Filing Date	12/31/2003
First Named Inventor	Donald A. Gardner
Examiner Name	Hsien Ming Lee
Art Unit	2823
Attorney Docket No.	42390.P16465

METHOD OF PAYMENT (check all that apply)☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____☒ Deposit Account Deposit Account Number: 50-0221 Deposit Account Name: Intel Corporation

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☒ Charge fee(s) indicated below☐ Charge fee(s) indicated below, except for the filing fee☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17☒ Credit any overpayments

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FEE CALCULATION**1. BASIC FILING, SEARCH, AND EXAMINATION FEES**

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES**Fee Description**

Each claim over 20 (including Reissues)

Fee (\$)

Small Entity Fee (\$)

Each independent claim over 3 (including Reissues)

50

25

Multiple dependent claims

200

100

360

180

Total Claims**Extra Claims****Fee (\$)****Fee Paid (\$)**

- 20 or HP = _____ x _____ = _____

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims**Extra Claims****Fee (\$)****Fee Paid (\$)**

- 3 or HP = _____ x _____ = _____

HP = highest number of independent claims paid for, if greater than 3.

3. APPLICATION SIZE FEE

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Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
- 100 = _____	/ 50 = _____	(round up to a whole number) x _____	= _____	

4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)

Fees Paid (\$)

Other (e.g., late filing surcharge): _____

SUBMITTED BY

Signature	/Phillip A. Pedigo/Reg. No. 52,107/	Registration No. 52,107	Telephone 503-712-5560
Name (Print/Type)	Phillip A. Pedigo		Date January 31, 2007

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Application No. 10/750,522
Response to Office action of November 8, 2007

Atty. Docket No. 042390.P16465
TC/A.U. 2823

an electrical contact formed on an upper surface of the layer of semiconductor material to provide an electric field to alter the electro-absorption of light in the optically active layer.

3. (Currently Amended) The device of claim 1, wherein the layer of SiGe is a strained layer of SiGe having a dopant to provide electrons in the strained layer of SiGe.
4. (Original) The device of claim 3, wherein the dopant is at least one of arsenic, phosphorus, and antimony.
5. (Original) The device of claim 3, wherein the strained layer of SiGe is between 20 and 70 percent Germanium.
6. (Original) The device of claim 5, wherein the strained layer of SiGe is 27 percent Germanium.
7. (Original) The device of claim 3, wherein the substrate is formed from silicon.

Application No. 10/750,522
Response to Office action of November 8, 2007

Atty. Docket No. 042390.P16465
TC/A.U. 2823

8. (Original) The device of claim 3, further comprising:
a second layer of semiconductor material formed on an upper surface of the substrate; and
wherein the optically active layer is formed on an upper surface of the second layer of semiconductor material.
9. (Original) The device of claim 8, wherein the second layer of semiconductor material is formed from silicon.
10. (Original) The device of claim 3, wherein the optically active layer further comprises:
a layer of semiconductor material formed on an upper surface of the first strained layer of SiGe; and
a second strained layer of SiGe formed on an upper surface of the semiconductor layer to provide a second quantum well, wherein the second strained layer of SiGe is doped with arsenic.
11. (Original) The device of claim 10, wherein a ratio of silicon to germanium in the first strained layer is different than a ratio of silicon to germanium in the second strained layer.

Application No. 10/750,522
Response to Office action of November 8, 2007

Atty. Docket No. 042390.P16465
TC/A.U. 2823

12. (Currently Amended) The device of claim + 2, wherein the optical modulator is an optical waveguide modulator.

13. (Original) The device of claim 12, further comprising an optical cavity in optical communication with the optically active layer.

14. (Currently Amended) The device of claim + 2, wherein the layer of SiGe has a thickness between five and thirty nanometers.

15. (Currently Amended) The device of claim + 2, wherein the substrate is formed from germanium.

Claims 16-30 (Withdrawn)

31. (Cancelled) An integrated circuit comprising:
a substrate formed from a semiconductor material;

Application No. 10/750,522
Response to Office action of November 8, 2007

Atty. Docket No. 042390.P16465
TC/A.U. 2823

an optical modulator with an optically active layer formed on the semiconductor substrate, the optically active layer including a strained layer of SiGe having a quantum well to provide electro-absorption of light; and
an optical fiber having a first end in optical communication with the optical modulator.

32. (Currently Amended) ~~The system of claim 31~~ An integrated circuit comprising:
a substrate formed from a semiconductor material;
an optical modulator with an optically active layer formed on the semiconductor
substrate, the optically active layer including a strained layer of SiGe having a quantum
well to provide electro-absorption of light, wherein the strained layer of SiGe is doped
with at least one of arsenic, phosphorus, and antimony; and
an optical fiber having a first end in optical communication with the optical
modulator.

33. (Original) The system of claim 32, further comprising a light-emitting source
fabricated on the semiconductor substrate to provide an optical signal to the optical
modulator.

34. (Original) The system of claim 33, further comprising a photodetector in optical
communication with a second end of the optical fiber to receive light.

Application No. 10/750,522
Response to Office action of November 8, 2007

Att. Docket No. 042390.P16465
TC/A.U. 2823

35. (Currently Amended) The system of claim ~~31~~ 32, wherein the substrate is formed from silicon.

36. (Original) The system of claim 35, wherein the strained layer of SiGe is between 20 and 70 percent Germanium.

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Application No. 10/750,522
Response to Office action of November 8, 2007

Atty. Docket No. 042390.P16465
TC/A.U. 2823

Remarks

The Applicant respectfully requests reconsideration of the present U.S. Patent application as amended herein. Claims 16-30 have been withdrawn. Claims 1 and 31 have been cancelled without prejudice. Claims 2, 3, 12, 14, 15, 32, and 35 have been amended. Thus, claims 2-15 and 32-36 remain pending in the application.

Claim Objections

Claims 32-36 were objected to because of an informality associated with the preambles of each claim. In response, the Applicant has amended the preamble of each claim to correct the informality. Thus, the Applicant respectfully requests that the objection to claims 32-36 be withdrawn.

Allowable Subject Matter

Claims 2-11 and 32-34 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 2-11 depend (directly or indirectly) from claim 1 and claims 32-36 depend (directly or indirectly) from claim 31.

Claim 2 has been rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 3, 12, 14, and 15 have been amended to depend from amended claim 2. Original claims 4-11 and 13 depend (either directly or indirectly) from claim 2. Thus, claim 2 is allowable and claims 3-11 depend from an allowable claim.

Application No. 10/750,522
Response to Office action of November 8, 2007

Atty. Docket No. 042390.P16465
TC/A.U. 2823

Claim 32 has been rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 35 has been amended to depend from amended claim 32. Original claims 33, 34, and 36 depend (either directly or indirectly) from claim 32. Thus, claim 32 is allowable and claims 33-36 depend (either directly or indirectly) from an allowable claim.

Claim Rejections § 102

Claims 1, 12, and 13 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,954,473 issued to Dehmubed et al. (*Dehmubed*). Claim 1 has been cancelled without prejudice and, thus, the rejection of claim 1 is moot. For at least the reasons set forth below, the Applicant submits that claims 12 and 13 are not anticipated by *Dehmubed*.

Claims 12 and 13 have been amended to depend (directly or indirectly) from allowable claim 2. For at least the reason that dependent claims include the limitations of the claims from which they depend, the Applicant respectfully submits that claims 12 and 13 are not anticipated by *Dehmubed*.

Claim Rejections § 103

Claim 14 was rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,949,761 issued to Chu et al. (*Chu*). For at least the reasons set forth below, the Applicant submits that claim 14 is patentable over *Chu*.

Application No. 10/750,522
Response to Office action of November 8, 2007

Atty. Docket No. 042390.P16465
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Claim 14 has been amended to depend (directly or indirectly) from allowable claim 2. For at least the reason that dependent claims include the limitations of the claims from which they depend, the Applicant respectfully submits that claim 14 is patentable over *Chu*.

Claim 15 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Dehmubed* in view of U.S. Patent No. 6,424,450 issued to Goossen (*Goossen*). For at least the reasons set forth below, the Applicant submits that claim 15 is patentable over *Dehmubed* in view *Goossen*.

Claim 15 has been amended to depend (directly or indirectly) from allowable claim 2. For at least the reason that dependent claims include the limitations of the claims from which they depend, the Applicant respectfully submits that claim 15 is patentable over *Dehmubed* in view *Goossen*.

Claims 31, 35, and 36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Dehmubed* in view of U.S. Patent No. 6,403,975 issued to Brunner et al. (*Brunner*). Claim 31 has been cancelled without prejudice and, thus, the rejection of claim 31 is moot. For at least the reasons set forth below, the Applicant submits that claims 35 and 36 are patentable over *Brunner*.

Claims 35 and 36 have been amended to depend (directly or indirectly) from allowable claim 32. For at least the reason that dependent claims include the limitations of the claims from which they depend, the Applicant respectfully submits that claims 35 and 36 are patentable over *Dehmubed* in view *Brunner*.

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TC/A.U. 2823

Conclusion

The Examiner is respectfully requested to contact the undersigned by telephone if such contact would further the examination of the present application.

Respectfully submitted,

Date: January 31, 2007

/Philip A. Pedigo/
Philip A. Pedigo
Reg. No. 52,107
Attorney for Intel Corporation

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Santa Clara, CA 95052
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